

REMARKS

Claims 1-49 are currently pending in the application, with claims 1, 2, 19, 43 and 44 being independent. Claims 1-49 were pending prior to the Office Action. In this Reply, claims 1, 2, 19, 43 and 44 have been amended.

The Examiner is respectfully requested to reconsider the rejections in view of the amendments and remarks set forth herein. Applicant respectfully requests favorable consideration thereof in light of the amendments and comments contained herein, and earnestly seeks timely allowance of the pending claims.

Claim Rejections – 35 U.S.C. §103

Claims 1 and 43 and Claims Depending Therefrom

The Examiner rejected claims 1, 3-5, 11, 13, 15, 18 and 43 under 35 U.S.C. § 103(a) as being unpatentable over US 6,137,535 (“Meyers”) in view of US 7,084,905 (“Nayar”). The Examiner rejected claims 6, 7 and 12 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar further in view of US 7,139,028 (“Itano”). The Examiner rejected claims 8-10 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar further in view of US 6,933,972 (“Suzuki et al.”). The Examiner rejected claim 14 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar further in view of US 5,063,439 (“Tabei”). The Examiner rejected claims 16-17 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar further in view of US 5,055,921 (“Usui”). The Examiner rejected claim 41 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of US 5289269 (“Sugimori”).

Applicant traverses these rejections.

Applicant has amended independent claims 1 and 43.

Applicant has amended claim 1 to recite wherein the inside of each of said photoelectric conversion areas is two-dimensionally partitioned into a plurality of segments which output a plurality of photoelectric conversion signals of different spectral sensitivities using transfer electrodes, wherein an aperture in said light-shielding film corresponds to at least two of said segments in one of said photoelectric conversion areas, and wherein the diameter or diagonal

dimension of said aperture is smaller than the diameter or diagonal dimension of said one photoelectric conversion area, and is larger than a dimension of at least one segment, and wherein a distance between two of said transfer electrodes is smaller than a distance across segments adjacent to said two transfer electrodes.

Applicant has amended claim 43 to recite an image pickup device including image capturing means for outputting a plurality of photoelectric conversion signals of different spectral sensitivities using transfer electrodes, wherein said image capturing means includes [...] light-shielding means, wherein an aperture in said light-shielding means corresponds to at least two of said segments in one of said photoelectric conversion areas, and the diameter or diagonal dimension of said aperture is smaller than the diameter or diagonal dimension of said one photoelectric conversion area, and is larger than a dimension of at least one segment, and wherein a distance between two of said transfer electrodes is smaller than a distance across segments adjacent to said two transfer electrodes.

To establish a *prima facie* case of obviousness, the Examiner has the burden of meeting the basic criterion that the prior art must teach or suggest all of the claim limitations.

Regarding this basic criterion, the Applicant submits that Meyers and Nayar do not disclose or suggest a distance between two transfer electrodes being smaller than a distance across segments adjacent to the two transfer electrodes.

Meyers merely discloses a compact digital camera formed with a lenslet array 10 comprised of a plurality of lenslets 12, each lenslet having a decentration corresponding to its radial position in the lenslet array 10 so that the axial ray of each lenslet 12 views a different segment of a total field of view. A photosensor array 20 comprised of a plurality of sub-groups of photodetectors 22 is positioned such that each sub-group 22 is located along the axial ray of a respective lenslet 12. A field limiting baffle comprised of at least one aperture plate is positioned such that the center of the apertures are located along the axial ray of a respective lenslet (Abstract, Figs. 1B and 2).

Meyers does not disclose and does not illustrate any transfer electrodes. Hence, Meyers does not disclose or suggest a distance between two transfer electrodes being smaller than a distance across segments adjacent to the two transfer electrodes.

Nayar merely discloses a method and apparatus for obtaining relatively high dynamic range images using a relatively low dynamic range image sensor without significant loss of resolution. The image sensor has an array of light-sensing elements with different sensitivity levels in accordance with a predetermined spatially varying sensitivity pattern for the array of light-sensing elements. An image of a scene is captured with the image sensor and stored as brightness values at respective pixel positions in a linear or two-dimensional uniform grid (Abstract).

Nayar does not disclose or suggest a distance between two transfer electrodes being smaller than a distance across segments adjacent to the two transfer electrodes.

The Examiner pointed to Fig. 11 of Nayar (page 5 of Office Action). Fig. 11 illustrates a cross section of two adjacent light-sensing elements and associated structure of a CCD image sensor. A light shields layer 113 has respective apertures 118 and 119 above the photosensitive surfaces 191 of the left and right light-sensing elements. Photodiodes have an associated transfer gate electrodes 114 (col. 16 lines 16-18). Nayar does not disclose or suggest any photoelectric conversion area two-dimensionally partitioned into a plurality of segments. Nayar also does not disclose or suggest that a distance between two transfer electrodes is smaller than a distance across segments adjacent to the two transfer electrodes. In Nayar, a distance between two transfer electrodes 114 illustrated in Fig. 11 is not smaller than a distance across segments adjacent to the transfer electrodes, because such segments do not exist in Nayar.

Therefore, Meyers and Nayar do not teach or suggest all of the elements of claim 1.

Independent claim 43 defines over Meyers and Nayar at least based on reasoning similar to that set forth above.

Claims 6, 7 and 12 depend from claim 1.

Applicant submits that the Examiner's reliance on Itano on page 9 of the Office Action as allegedly pertaining to incremental features of claims 6, 7 and 12 fails to make up for the deficiencies of the asserted Meyers and Nayar references discussed above with respect to independent claim 1. Therefore, the asserted grounds of rejection fail to establish *prima facie* obviousness of claims 6, 7 and 12 depending from claim 1.

Itano does not disclose or suggest a distance between two transfer electrodes being smaller than a distance across segments adjacent to the two transfer electrodes. Itano also does not disclose or suggest any photoelectric conversion area two-dimensionally partitioned into a plurality of segments. In Itano, no segments in a photoelectric conversion unit 41 in Fig. 10, for example, are disclosed or suggested. Hence, a distance between two interconnections 42, for example, is not smaller than a distance across segments adjacent to the interconnections, as such segments do not exist in Itano. Therefore, Itano does not teach or suggest all elements of claim 1.

Claims 8-10 depend from claim 1. Applicant submits that the Examiner's reliance on Suzuki on page 16 of the Office Action as allegedly pertaining to incremental features of claims 8-10 fails to make up for the deficiencies of the asserted Meyers and Nayar references discussed above with respect to independent claim 1. Therefore, the asserted grounds of rejection fail to establish *prima facie* obviousness of claims 8-10.

The teachings of Meyers and Nayar are presented above in the arguments traversing the §102 rejections of claim 1. As provided above in the arguments for the allowability of claim 1, Meyers and Nayar fail to teach or suggest a distance between two transfer electrodes being smaller than a distance across segments adjacent to the two transfer electrodes, as recited in claim 1.

Suzuki et al. merely discloses a MOS type image pickup device having a pixel interleaved array layout and one analog to digital conversion unit provided per each pair of adjacent photoelectric conversion columns. A number of photoelectric conversion elements are disposed in a plurality of rows and columns in a pixel shift layout, and an analog/digital conversion unit is provided per two photoelectric conversion element columns to form a MOS type solid-state image pickup device. (Abstract)

Suzuki et al. does not disclose or suggest wherein an aperture in a light-shielding film corresponds to at least two of said segments in one of said photoelectric conversion areas, and wherein the diameter or diagonal dimension of said aperture is smaller than the diameter or diagonal dimension of said one photoelectric conversion area, and is larger than a dimension of at least one segment, and wherein a distance between two of said transfer electrodes is smaller

than a distance across segments adjacent to said two transfer electrodes, as recited in claim 1. Hence, Suzuki et al. fails to teach or suggest all of the elements for claim 1.

Claim 14 depends from claim 1. Applicant submits that the Examiner's reliance on Tabei on page 18 of the Office Action as allegedly pertaining to incremental features of claim 14 fails to make up for the deficiencies of the asserted Meyers and Nayar references discussed above with respect to independent claim 1. Therefore, the asserted grounds of rejection fail to establish *prima facie* obviousness of claims 14.

Tabei merely discloses a solid state pickup system having improved color reproducibility characteristics. The solid state pickup system uses additional photodetector elements to produce color signals including wavelength components in areas of negative stimulus values. These color signals are subtracted from conventionally produced color signals, such conventionally produced color signals being incapable of representing the negative stimulus values. The algebraic difference between the color signals resulting from the subtraction operation results in a color signal adequately represented in a wider range of wavelength characteristics, including the negative stimulus values, to improve color reproducibility (Abstract).

Tabei does not discuss photoelectric conversion areas for which the inside is two-dimensionally partitioned into a plurality of segments which output a plurality of photoelectric conversion signals of different spectral sensitivities. Tabei also does not discuss light-shielding films. Hence, Tabei does not disclose or suggest wherein an aperture in a light-shielding film corresponds to at least two of said segments in one of said photoelectric conversion areas, and wherein the diameter or diagonal dimension of said aperture is smaller than the diameter or diagonal dimension of said one photoelectric conversion area, and is larger than a dimension of at least one segment, and wherein a distance between two of said transfer electrodes is smaller than a distance across segments adjacent to said two transfer electrodes, as recited in claim 1. Hence, Tabei fails to teach or suggest all of the elements for claim 1.

Claims 16-17 depend from claim 1. Applicant submits that the Examiner's reliance on Usui on page 19 of the Office Action as allegedly pertaining to incremental features of claims 16-17 fails to make up for the deficiencies of the asserted Meyers and Nayar references

discussed above with respect to independent claim 1. Therefore, the asserted grounds of rejection fail to establish *prima facie* obviousness of claims 16-17.

Usui merely discloses a color reading line sensor including sensor arrays each comprising a plurality of sensor elements with color filter elements. These sensor arrays are aligned in a direction normal to a sensor array direction, and the size of a particular color sensor element in a direction normal to the sensor array direction is set to be larger than that of the other color sensor element in the same direction (Abstract).

Usui does not discuss light-shielding films. Hence, Usui does not disclose or suggest wherein an aperture in a light-shielding film corresponds to at least two of said segments in one of said photoelectric conversion areas, and wherein the diameter or diagonal dimension of said aperture is smaller than the diameter or diagonal dimension of said one photoelectric conversion area, and is larger than a dimension of at least one segment, and wherein a distance between two of said transfer electrodes is smaller than a distance across segments adjacent to said two transfer electrodes. Hence, Usui fails to teach or suggest all of the elements for claim 1.

Claim 41 depends from claim 1. Applicant submits that the Examiner's reliance on Sugimori on page 24 of the Office Action as allegedly pertaining to incremental features of claim 41 fails to make up for the deficiencies of the asserted Meyers and Nayar references discussed above with respect to independent claim 1. Therefore, the asserted grounds of rejection fail to establish *prima facie* obviousness of claim 41.

Sugimori merely discloses obtaining interlaced television signals from four image pickup devices. A luminance or green signal in the interlaced television signals consists of two interlaced channels. These two channel luminance or green signals are combined to produce the non-interlaced signal without modifying the driving frequency of the image pickup devices (Abstract).

Sugimori does not discuss photoelectric conversion areas for which the inside is two-dimensionally partitioned into a plurality of segments which output a plurality of photoelectric conversion signals of different spectral sensitivities. Sugimori also does not discuss light-shielding films. Hence, Sugimori does not disclose or suggest wherein an aperture in a light-shielding film corresponds to at least two of said segments in one of said photoelectric

conversion areas, and wherein the diameter or diagonal dimension of said aperture is smaller than the diameter or diagonal dimension of said one photoelectric conversion area, and is larger than a dimension of at least one segment, and wherein a distance between two of said transfer electrodes is smaller than a distance across segments adjacent to said two transfer electrodes. Hence, Sugimori fails to teach or suggest all of the elements for claim 1.

For all of the above reasons, taken alone or in combination, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. § 103 rejection of claims 1 and 43. Claims 3-18 and 41 depend from claim 1 and are allowable at least by virtue of their dependency.

Claims 2, 19 and 44 and Claims Depending Therefrom

The Examiner rejected claims 2, 19, 20, 22-25, 31, 33, 35, 38, 39, 40, 42, 44, 45 and 47-49 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar further in view of US 2002/0113888 ("Sonoda"). The Examiner rejected claims 21, 26-27, 32 and 46 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of Sonoda further in view of Itano. The Examiner rejected claims 28-30 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of Sonoda further in view of Suzuki. The Examiner rejected claim 34 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of Sonoda further in view of Tabei. The Examiner rejected claims 36-37 under 35 U.S.C. § 103(a) as being unpatentable over Meyers in view of Nayar in view of Sonoda further in view of Usui.

Applicant traverses these rejections.

Applicant respectfully submits the Examiner has failed to establish a *prima facie* case of obviousness.

Applicant has amended claim 2 to recite transfer channels, for transferring said signal electric charges read from a plurality of said segments, are formed beside said photoelectric conversion areas, said transfer channels extending along perimeters of said photoelectric conversion areas that are partitioned into said plurality of segments which store said signal electric charges of different spectral sensitivities, said transfer channels extending substantially

parallel to said perimeters.

Applicant has also amended claim 19 to recite transfer channels, for transferring signal electric charges read from a plurality of said segments, are formed beside said photoelectric conversion areas, said transfer channels extending along perimeters of said photoelectric conversion areas and substantially parallel to said perimeters.

Applicant has amended claim 44 to recite signal transfer means for transferring said electric charges read from a plurality of said segments through channels being formed beside said photoelectric conversion areas, said channels extending along perimeters of said photoelectric conversion areas and substantially parallel to said perimeters.

To establish a *prima facie* case of obviousness, the Examiner has the burden of meeting the basic criterion that the prior art must teach or suggest all of the claim limitations.

Regarding this basic criterion, Meyers, Nayar and Sonoda do not disclose or suggest transfer channels extending along perimeters of said photoelectric conversion areas that are partitioned into said plurality of segments which store said signal electric charges of different spectral sensitivities, said transfer channels extending substantially parallel to said perimeters, as recited in claim 2.

Meyers and Nayar do not disclose or suggest transfer channels or channels as claimed in claims 2, 19 and 44. Hence, Meyers and Nayar do not disclose or suggest transfer channels extending substantially parallel to perimeters of photoelectric conversion areas. Hence, Meyers and Nayar fail to teach or suggest all of the elements for claims 2, 19 and 44.

Sonoda merely discloses an image pickup apparatus including a pixel area including a plurality of pixels, and a substrate on which the pixel area is integrated, wherein the centers of the pixel area and substrate substantially coincide with each other (Abstract).

On page 11 of the Office Action, the Examiner alleged that Sonoda teaches transfer channels in Fig. 5. Fig. 5 illustrates the vicinity of the pixel area 103 from FIG. 2. In FIG. 5, vertical output lines 705 are used to read out outputs from pixel groups 102a to 102d. Amplifiers 201 are connected to the vertical output line 705 to amplify outputs read out from the pixel groups 102a to 102d. The output lines 705 reach the horizontal shift registers 203 (paragraph [0046]).

The output lines 705 in Sonoda are not channels or transfer channels extending substantially parallel to perimeters of pixel groups 102. As illustrated in Fig. 5, output lines 705 are perpendicular to perimeters of pixel groups 102 a, 102b, 102c or 102d. The output lines 705 do not extend substantially parallel to perimeters of pixel groups 102.

Hence, Sonoda fails to teach or suggest all of the elements for claims 2, 19 and 44.

Claims 21, 26-27 and 32 depend from claim 19. Claim 46 depends from claim 2. Applicant submits that the Examiner's reliance on Itano on pages 20, 21 and 23 of the Office Action as allegedly pertaining to incremental features of claims 21, 26-27, 32 and 46 fails to make up for the deficiencies of the asserted Meyers, Nayar and Sonoda references discussed above with respect to independent claims 2 and 19. Therefore, the asserted grounds of rejection fail to establish *prima facie* obviousness of claims 21, 26-27, 32 and 46.

The teachings of Meyers, Nayar and Sonoda are presented above in the arguments traversing the §103 rejections of claims 2 and 19. As provided above in the arguments for the allowability of claim 19, Meyers, Nayar and Sonoda fail to teach or suggest transfer channels extending along perimeters of photoelectric conversion areas and substantially parallel to said perimeters.

Itano does not disclose or suggest transfer channels extending along perimeters of photoelectric conversion areas and substantially parallel to said perimeters. Itano only discloses signal lines 912 which are perpendicular to perimeters of image pickup areas 901 (Fig. 14). The signal lines 912 do not extend along perimeters of image pickup areas 901 and substantially parallel to the perimeters.

Hence, Itano fails to teach or suggest all of the elements for claims 2 and 19.

Claims 28-30 depend from claim 19. Applicant submits that the Examiner's reliance on Suzuki on page 24 of the Office Action as allegedly pertaining to incremental features of claims 28-30 fails to make up for the deficiencies of the asserted Meyers, Sonoda and Nayar references discussed above with respect to independent claim 19. Therefore, the asserted grounds of rejection fail to establish *prima facie* obviousness of claim 28-30.

Suzuki does not disclose or suggest transfer channels extending along perimeters of photoelectric conversion areas and substantially parallel to said perimeters. For example, in FIG.

2 (which illustrates details for FIG. 1A), FIG. 6, FIG. 10 (which illustrates details for FIG. 9) and FIG. 11 of Suzuki et al., output signal lines 30 and row select signal wiring lines 25 are connected to each switching circuit unit 20 (or switching circuit units 120 in FIGS. 10 and 11) provided for each photoelectric conversion element 10. As it can be seen in FIGS. 2, 6, 10 and 11, the output signal lines 30 and row select signal wiring lines 25 meander through and in between switching circuit units 20. No collection of switching circuit units 20 can form a photoelectric conversion area, for which transfer channels are formed beside photoelectric conversion areas, the transfer channels extending along perimeters of photoelectric conversion areas and substantially parallel to the perimeters. This is so because output signal lines 30 and row select signal wiring lines 25 meander through and in between switching circuit units 20 (or 120) in such a way that any collection of switching circuit units 20 (or 120) would include at least one output signal line 30 and/or row select signal wiring line 25 passing through the collection of units 20. Hence, Suzuki et al. fails to teach or suggest all of the elements for claim 19.

Claims 34 and 36-37 depend from claim 19. Applicant submits that the Examiner's reliance on Tabei and Usui on page 24 of the Office Action as allegedly pertaining to incremental features of claims 34, 36 and 37 fails to make up for the deficiencies of the asserted Meyers, Nayar and Sonoda references discussed above with respect to independent claim 19. Therefore, the asserted grounds of rejection fail to establish *prima facie* obviousness of claim 34, 36 and 37.

Tabei and Usui do not discuss transfer channels. Hence, Tabei and Usui do not disclose or suggest transfer channels extending along perimeters of said photoelectric conversion areas and substantially parallel to said perimeters. Hence, Tabei and Usui fail to teach or suggest all of the elements for claim 19.

For all of the above reasons, taken alone or in combination, Applicant respectfully requests reconsideration and withdrawal of the 35 U.S.C. § 103 (a) rejection of claims 2, 19 and 44. Claims 45-47 depend from claim 2 and are allowable at least by virtue of their dependency. Claims 20-40, 42 and 48 depend from claim 19 and are allowable at least by virtue of their

dependency. Claim 49 depends from claim 44 and is allowable at least by virtue of its dependency.

CONCLUSION


In view of the above amendments and remarks, this application appears to be in condition for allowance and the Examiner is, therefore, requested to reexamine the application and pass the claims to issue.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Corina E. Tanasa, Limited Recognition No. L0292 under 37 CFR §11.9(b), at telephone number (703) 208-4003, located in the Washington, DC area, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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